

REMARKS

Summary of the Office Action

Claims 1, 4-6, 11-13, 15, 18-20, 25-27 and 29-32 are considered in the Office action.

Claims 1, 4-6, 11-13, 15, 18-20, 25-27 and 29-32 have been rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement.

Claims 1, 11-13, 15 and 25-27 have been rejected under 35 U.S.C. § 103(a) as obvious over Kurogane U.S. Patent No. 6,259,424 (“Kurogane”) in view of Krusius et al U.S. Patent No. 6,005,649 (“Krusius”), Lambert U.S. Patent No. 6,816,143 (“Lambert”) and Yamazaki et al. U.S. Patent No. 6,147,667 (“Yamazaki”).

Claims 29-32 have been rejected under 35 U.S.C. § 103(a) as obvious over Yamazaki, Krusius, Kurogane, Lambert and Hiroki U.S. Patent No. 6,618,115 (“Hiroki”).

Claims 4 and 18 have been rejected under 35 U.S.C. § 103(a) as obvious over Yamazaki, Krusius, Kurogane and Lambert.

Claims 5 and 19 have been rejected under 35 U.S.C. § 103(a) as obvious over Yamazaki, Krusius, Kurogane, Lambert and Yang U.S. Patent No. 6,392,427 (“Yang”).

Claims 6 and 20 have been rejected under 35 U.S.C. § 103(a) as obvious over Yamazaki, Krusius, Kurogane, Lambert and Anholm et al. U.S. Patent No. 5,043,655 (“Anholm”).

Reply to § 112, First Paragraph Rejections

Claims 1, 4-6, 11-13, 15, 18-20, 25-27 and 29-32 have been rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. In particular, the Office action states that the “fully manufacturing” and “fully manufactured” limitations in independent claims 1 and 15, respectively, are not described in the specification or shown in the drawings. Further, the Office action states that the specification describes the invention being implemented during, but not after, the manufacturing process. In addition, the Office action states that “for one skilled in

the art will be difficult to understand who and how will mitigate defects caused by inoperative pixels in a liquid crystal micro-display apparatus after manufacturing process during the usage of a liquid crystal micro-display apparatus.” Applicants respectfully disagree.

First, as set forth on page 13, lines 9-12 and lines 27-30, the specification expressly states that “testing and repair can be accomplished at any time in the manufacturing process, even after assembly of the LCD” (emphasis added). Applicants respectfully submit that a person of ordinary skill in the art would understand this phrase to mean that testing and repair may be performed after fully manufacturing the CMOS control chip.

In addition, the specification describes several embodiments of the invention that may be implemented after fully manufacturing the drive circuitry. In particular, the specification states that electronic display 10 includes a plurality of pixels with drive circuitry 12 for controlling the pixels. (Page 12, lines 1-6). Display 10 also includes “means for disconnecting an inoperative pixel from its defective drive circuitry,” and a “means for connecting the inoperative pixel to a working drive circuit” of a nearby pixel. (Page 12, lines 6-9 and 16-20; FIG. 1).

The specification then describes several illustrative embodiments of means for disconnecting an inoperative pixel from its defective drive circuitry, and means for connecting the inoperative pixel to a working drive circuit of a nearby pixel. In a first embodiment, bypass bit latches 34 and 44 and multiplexers 36 and 46 may be used to bypass defective drive circuitry, and couple an inoperative pixel to the drive circuit of a nearby pixel. (Page 12, lines 23-29; FIG. 2). In a second embodiment, bypass bit latches 34 and 44, tri-state transistors 38 and 48 and resistor 50 may be used to bypass defective drive circuitry, and couple an inoperative pixel to the drive circuit of a nearby pixel. The bypass bits “may be loaded from external memory after the display is turned ON.” (Page 12, line 29 through Page 13, line 1) (emphasis added).

Applicants respectfully submit that these two examples clearly describe how defective drive circuitry may be disconnected from an inoperative pixel, and how the inoperative pixel may be connected to a working drive circuit of a nearby pixel. Further, applicants respectfully submit that a person of ordinary skill in the art would understand that such steps may occur after fully manufacturing the drive circuitry.

Accordingly, applicants respectfully request that the § 112, first paragraph rejections be withdrawn.

Reply to § 103(a) Rejections

Claims 1, 4-6, 11-13, 15, 18-20, 25-27 and 29-32 have been rejected under 35 U.S.C. § 103(a) as obvious over various combinations of Kurogane, Krusius, Lambert, Yamazaki, Hiroki, Yang and Anholm. Amended independent claims 1 and 15 recite methods and apparatus for mitigating defects caused by inoperative pixels in a liquid crystal micro-display that includes a fully manufactured control chip. In particular, amended independent claims 1 and 15 recite methods and apparatus that connect an inoperative pixel to a working drive circuit of a nearby pixel that may be an adjacent pixel or a non-adjacent pixel. None of the cited references, alone or combined, describe or suggest such methods or apparatus.

The primary reference, Kurogane, describes a display matrix substrate used in a liquid crystal display apparatus, and a method of producing the display matrix substrate in a way that limits the adverse effects of defective switching elements. (Col. 1, lines 7-11; Col. 4, lines 18-27). In particular, during the process used to manufacture the display matrix substrate, transistors 1A and 1B, of pixels 21A and 21B, respectively, are formed on silicon substrate 10. (Col. 7, lines 55-57; FIG. 7). Electrical signals are used to detect defective transistors (and thus defective pixels). (Col. 8, lines 11-38). In the illustrated example, transistor 1A of pixel 21A is defective. (Col. 8, lines 7-10).

Next, a second or modified mask is used to prevent cutouts from being formed around defective pixels (such as defective pixel 21A), and then a portion is exposed between defective pixel 21A and normal pixel 21B (Col. 9, lines 5-16; Col. 9, lines 34-40). As a result, pixel electrode 2A of defective pixel 21A is electrically connected to pixel electrode 2B of the adjacent normal pixel 21B. (Col. 9, lines 57-61). In operation, a video signal applied to the pixel electrode 2A of the defective pixel 21A is replaced by a video signal applied to the pixel electrode 2B of the adjacent normal pixel 21B. (Col. 10, lines 23-28).

Unlike the claimed invention, Kurogane does not describe or suggest anything regarding methods or apparatus for mitigating defects caused by inoperative pixels in a display that includes a fully manufactured control chip. Indeed, Kurogane's

process used to “limit the adverse effects of defective switching elements” occurs entirely during manufacture of the display matrix substrate. (Col. 7, line 53 through Col. 9, line 64; Col. 15, lines 61-67). Kurogane does not describe or suggest any defect mitigation techniques that may be used post-manufacture.


Further, unlike the claimed invention, Kurogane does not describe or suggest anything regarding methods or apparatus that connect an inoperative pixel to a working drive circuit of a nearby pixel that may be an adjacent pixel or a non-adjacent pixel. Instead, Kurogane only describes a process in which the pixel electrode 2A of the defective pixel 21A is electrically connected to the pixel electrode 2B of the adjacent normal pixel 21B. (Col. 9, lines 56-60; Col. 10, lines 10-14; Col. 10, lines 46-51; Col. 11, lines 7-12; Col. 14, lines 9-13). Kurogane does not describe or suggest any defect mitigation techniques that connect an inoperative pixel to a working drive circuit of a nearby pixel that may be an adjacent pixel or a non-adjacent pixel.

For both of these reasons, applicants respectfully submit that Kurogane is irrelevant to the claimed invention. Further, for all of the reasons previously stated, applicants respectfully submit that none of the other cited references, alone or combined, describe or suggest the claimed invention. Because the cited references do not describe or suggest the claimed invention, applicants respectfully request that the §103(a) rejections of amended claims 1 and 15 be withdrawn. Because all other claims depend either from claims 1 or 15, applicants respectfully request that the §103(a) rejections of claims 4-6, 11-13, 18-20, 25-27 and 29-32 also be withdrawn.

Conclusion

Applicants submits that this application, including claims 1, 4-6, 11-13, 15, 18-20, 25-27 and 29-32, is allowable. Applicants therefore respectfully request that the Examiner allow this application.

Respectfully submitted,


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